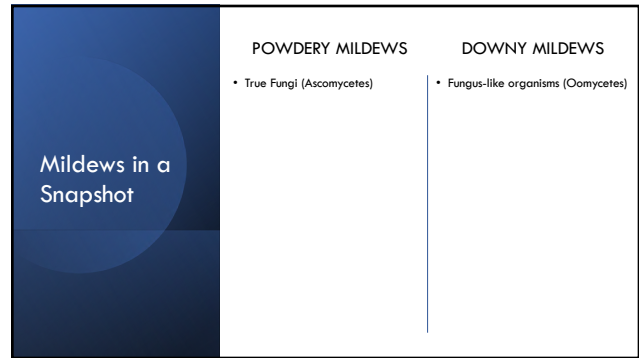
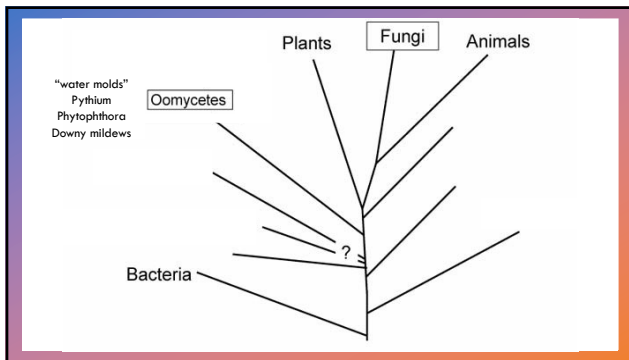




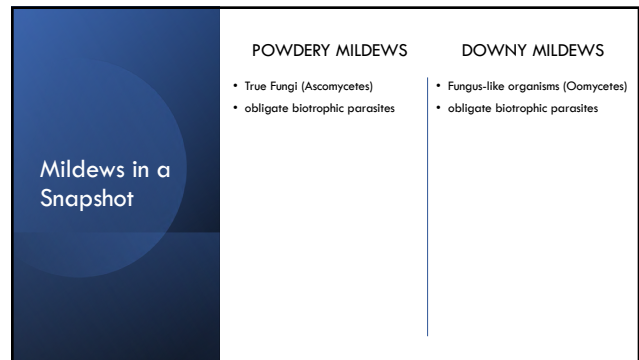
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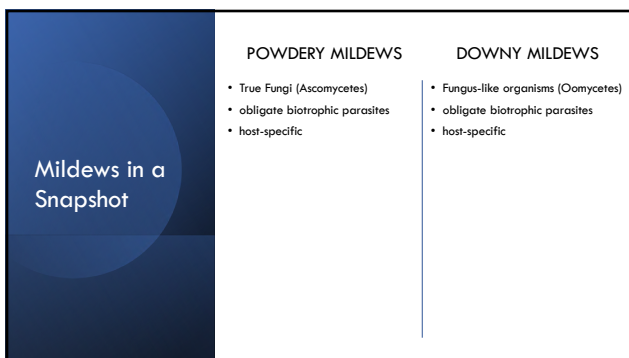
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Host range of important mildews			
Powdery mildew	Host(s)	Downy mildew	Host(s)
<i>Podosphaera pannosa</i>	Rose	<i>Peronospora sparsa</i>	Rose
<i>Erysiphe syringae</i>	Lilac	<i>Peronospora lamii</i>	Coleus Salvia Mint Dead nettle
<i>Galavinothymus magnicellulatus</i>	Phlox	<i>Plasmopara halstedii</i>	Rudbeckia Sunflower +35 Asteraceae genera
<i>Galavinothymus cichoracearum</i>	Rudbeckia many Asteraceae	<i>Plasmopara obducens</i>	Impatiens
<i>Podosphaera xanthii</i>	Calibrachoa Verbena Petunia		

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## Mildews in a Snapshot

POWDERY MILDEWS	DOWNY MILDEWS
<ul style="list-style-type: none"> <li>True Fungi (Ascomycetes)</li> <li>obligate parasites</li> <li>host-specific</li> <li>powdery sporulation on top side of leaf (most) and underside (less)</li> </ul>	<ul style="list-style-type: none"> <li>Fungus-like organisms (Oomycetes)</li> <li>obligate parasites</li> <li>host-specific</li> <li>downy sporulation on underside of leaf only</li> </ul>

7



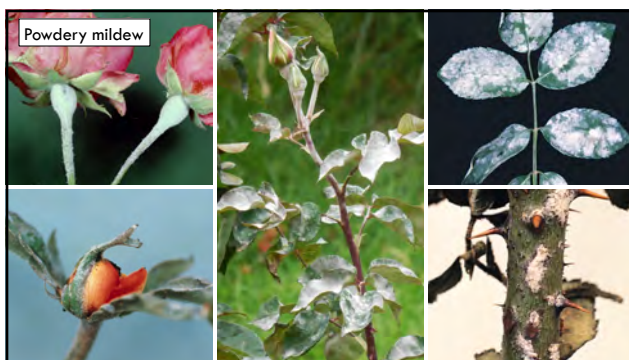
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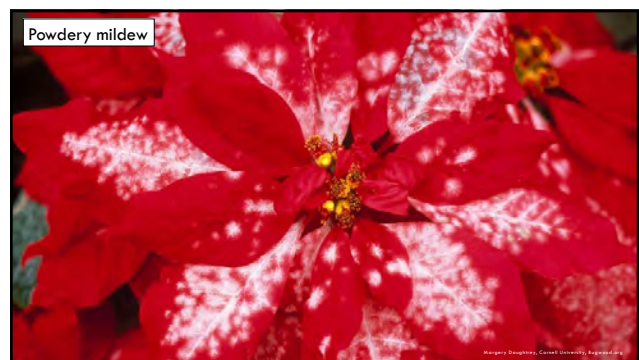
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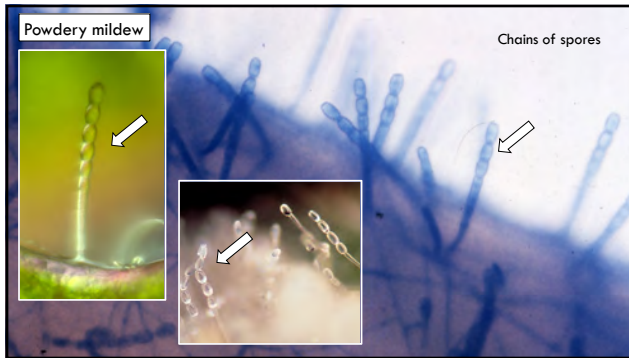
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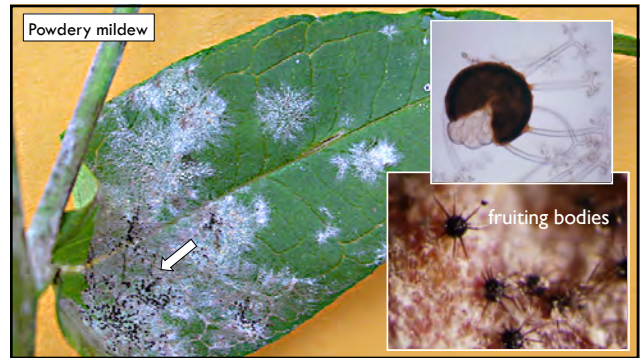
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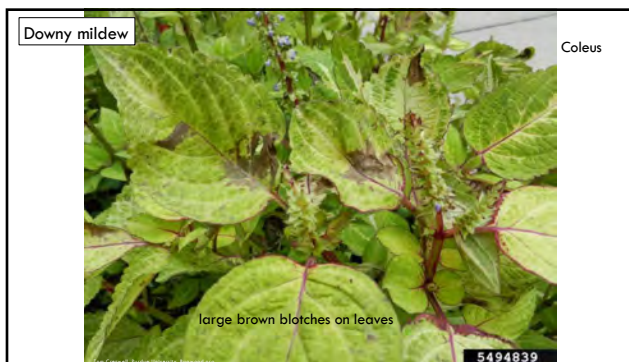
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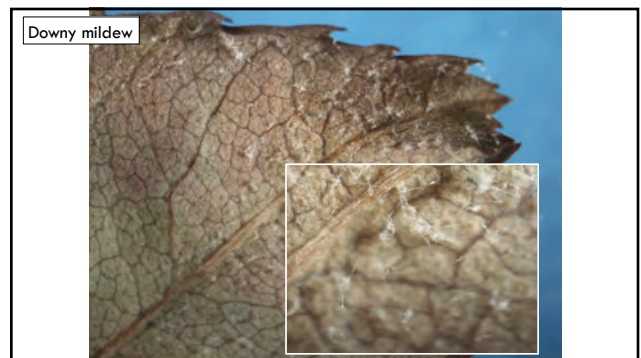


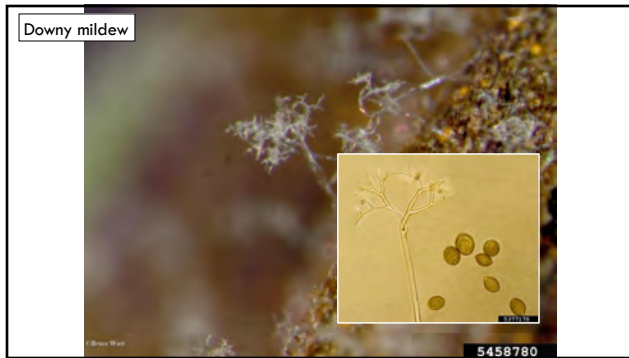


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<p>Mildews in a Snapshot</p>	<p><b>POWDERY MILDEWS</b></p> <ul style="list-style-type: none"> <li>• True Fungi (Ascomycetes)</li> <li>• obligate parasites</li> <li>• host-specific</li> <li>• powdery sporulation on top side of leaf (most) and underside (less)</li> <li>• prefer moderate temperatures (70-80°F)</li> </ul>	<p><b>DOWNY MILDEWS</b></p> <ul style="list-style-type: none"> <li>• Fungus-like organisms (Oomycetes)</li> <li>• obligate parasites</li> <li>• host-specific</li> <li>• downy sporulation on underside of leaf only</li> <li>• prefer cooler temperatures (58-72°F)</li> </ul>

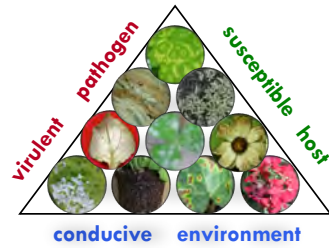
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<p>Mildews in a Snapshot</p>	<p><b>POWDERY MILDEWS</b></p> <ul style="list-style-type: none"> <li>• True Fungi (Ascomycetes)</li> <li>• obligate parasites</li> <li>• host-specific</li> <li>• powdery sporulation on top side of leaf (most) and underside (less)</li> <li>• prefer moderate temperatures (70-80°F)</li> <li>• high humidity (&gt;85%)</li> </ul>	<p><b>DOWNY MILDEWS</b></p> <ul style="list-style-type: none"> <li>• Fungus-like organisms (Oomycetes)</li> <li>• obligate parasites</li> <li>• host-specific</li> <li>• downy sporulation on underside of leaf only</li> <li>• prefer cooler temperatures (58-72°F)</li> <li>• high humidity (&gt;85%)</li> </ul>

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## The Disease Triangle



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## Mildews in a Snapshot

### POWDERY MILDEWS

- True Fungi (Ascomycetes)
- obligate parasites
- host-specific
- powdery sporulation on top side of leaf (most) and underside (less)
- prefer moderate temperatures (70-80°F)
- high humidity (>85%)
- leaf wetness has negative impact on spore germination

### DOWNY MILDEWS

- Fungus-like organisms (Oomycetes)
- obligate parasites
- host-specific
- downy sporulation on underside of leaf only
- prefer cooler temperatures (58-72°F)
- high humidity (>85%)
- leaf wetness needed for spore dispersal and germination

34

## Mildews in a Snapshot

### POWDERY MILDEWS

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- reduce aesthetic appeal but generally don't cause plant death

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- high humidity (>85%)
- leaf wetness needed for spore dispersal and germination
- can cause plant death very quickly following symptoms onset

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### Mildews in a Snapshot

POWDERY MILDEWS	DOWNY MILDEWS
<ul style="list-style-type: none"> <li>True Fungi (Ascomycetes)</li> <li>obligate parasites</li> <li>host-specific</li> <li>powdery sporulation on top side of leaf (most) and underside (less)</li> <li>prefer moderate temperatures (70-80°F)</li> <li>high humidity (&gt;85%)</li> <li>leaf wetness has negative impact on spore germination</li> <li>reduce aesthetic appeal but generally don't cause plant death</li> <li>fungicides can be applied at first signs of disease</li> </ul>	<ul style="list-style-type: none"> <li>Fungus-like organisms (Oomycetes)</li> <li>obligate parasites</li> <li>host-specific</li> <li>downy sporulation on underside of leaf only</li> <li>prefer cooler temperatures (58-72°F)</li> <li>high humidity (&gt;85%)</li> <li>leaf wetness needed for spore dispersal and germination</li> <li>can cause plant death very quickly following symptoms onset</li> <li>necessary to prevent disease with fungicides</li> </ul>

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### Powdery mildew MANAGEMENT

- Maintain good air circulation and minimize shading
  - Plant in sunny locations and do not crowd plants
  - Thin out a fifth of the stems to improve air movement
- Water inhibits spore germination
  - overhead watering during the day with low RH
- Reduce overwintering inoculum through removal of infected leaves and stems each autumn
- Use resistant varieties
- If relying on fungicides, stretch application interval depending on environmental conditions

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### Downy mildew MANAGEMENT

- Keep plants dry
- Increase air circulation around plants by thinning and pruning to keep RH low
- Scout plants carefully for symptoms of the disease especially the undersides of leaves
- Immediately remove and discard infected plants and plant debris
- Use resistant cultivars when available

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### Foliar nematodes

- Microscopic roundworms
- Migratory, endo- and ecto-parasitic
- Migrate up the plant through a film of water
- Feed on aboveground plant parts causing injury to leaves, buds and young stems
- Enter the leaves through stomata or other natural openings
- Injury bounded by major veins in leaf

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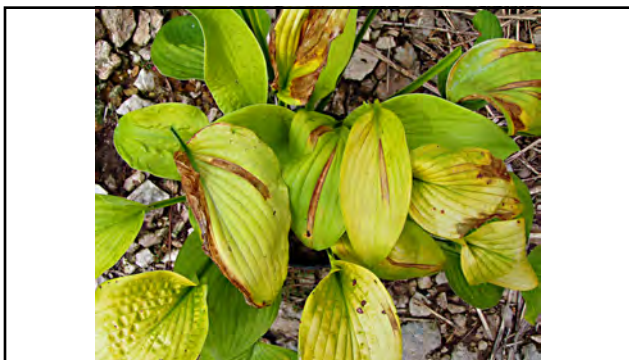




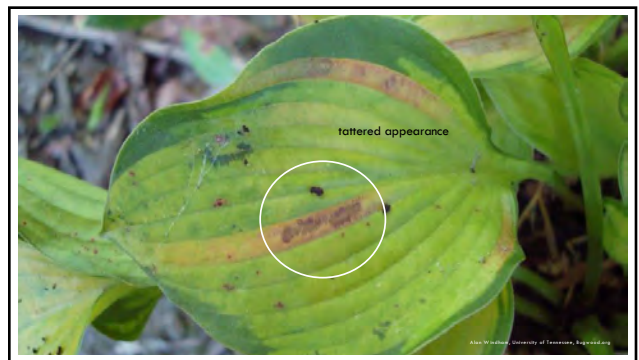
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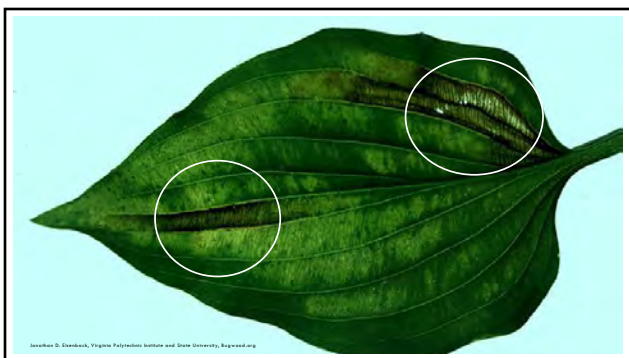
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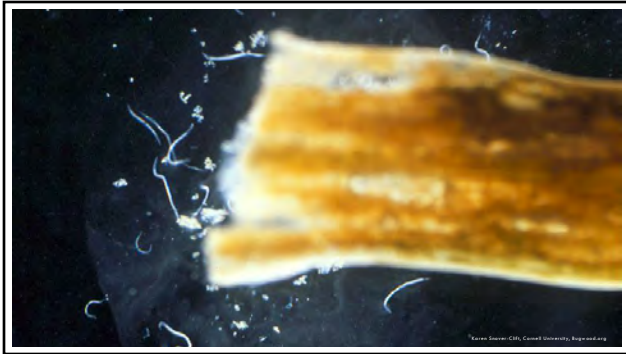


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Foliar nematodes  
MANAGEMENT

- Remove and destroy infected plants as soon as they are noticed - become familiar with characteristic symptoms
- Do not compost infected plants as nematodes can survive desiccation
- Replace or sterilize soil before planting susceptible varieties back in the same site
- Reduce overhead irrigation and leaf wetness duration through proper plant spacing
- No chemicals available to treat infested plants

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Fire

- Caused by *Botrytis tulipae*
- Most important disease of tulips
- Attack all parts of the plant
- Can cause total loss of flower crop
- Increasing damage in landscape beds year after year

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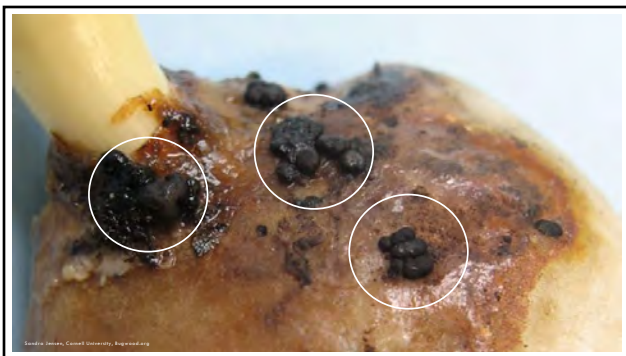
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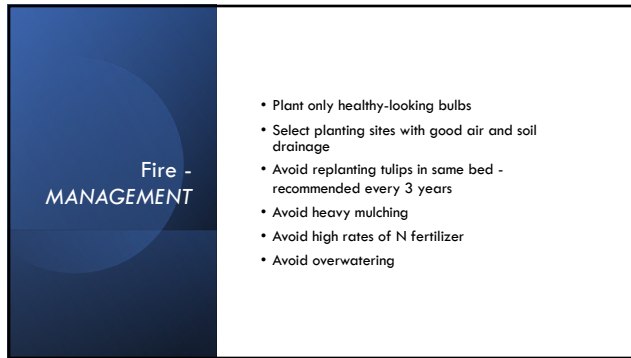


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Fire -  
MANAGEMENT

- Plant only healthy-looking bulbs
- Select planting sites with good air and soil drainage
- Avoid replanting tulips in same bed - recommended every 3 years
- Avoid heavy mulching
- Avoid high rates of N fertilizer
- Avoid overwatering

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Questions?

[u.osu.edu/handlab](http://u.osu.edu/handlab)  
[u.osu.edu/ornamentaldiseasefacts](http://u.osu.edu/ornamentaldiseasefacts)  
 @PrettyPlantsDoc

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